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**REMARKS**

In the Office Action dated October 10, 2006, the Examiner objected to claims 5-32 under 37 CFR § 1.75(c) as being in improper form; and rejected claims 1-4 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,261,874 to Castle in view of U.S. Patent No. 58588959 to Ahmad et al. The Examiner did not treat claims 5-32 on the merits based on the claim objection.

Applicant thanks the Examiner for conducting the telephone interview on December 21, 2006 with the undersigned regarding this application.

By this Reply, Applicant respectfully asks the Examiner to issue a corrected Office Action. Applicant points out that the Examiner did not address claims 33-64, which are currently pending in this application. Applicant filed a Preliminary Amendment on June 28, 2004, along with the present application, cancelling claims 1-32 and adding new claims 33-64. A copy of the as-filed Preliminary Amendment is enclosed. The PTO received the Preliminary Amendment on June 28, 2004, as evidenced by the enclosed filing postcard, which was stamped as received by the PTO on that date.

Applicant further points out that the Examiner's § 103 rejection is confusing. On page 2 of the Office Action, the Examiner provides general information regarding § 103 obviousness rejections. However, on page 3 of the Office Action, the Examiner rejects claims 1-4 under 35 U.S.C. § 102(b) as being anticipated by Castle in view of Ahmad. This language is improper for use in a § 102(b) rejection, and instead implies that the Examiner intended to reject claims 1-4 under § 103(a). Moreover, U.S. Patent No. 58588959 to Ahmad, as cited by the Examiner, does not exist. The patent number contains an extra digit.

Accordingly, for at least the reasons listed above, Applicant respectfully asks the Examiner to issue a corrected Office Action addressing claims 33-64, the claims currently pending in this application.

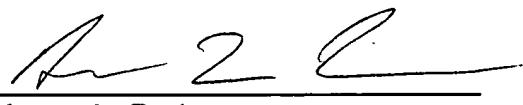
In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

Dated: December 22, 2004

By: 

Aaron L. Parker  
Reg. No. 50,785

**Attachments:**

- 1) a Preliminary Amendment filed June 28, 2004; and
- 2) a filing postcard, date-stamped by the PTO on June 28, 2004.



PATENT  
Customer No. 22,852  
Attorney Docket No. 7552.0032-00

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application: PCT/IB02/05572 )  
Francesco FONTANAZZI ) Group Art Unit: Unassigned  
Application No.: Unassigned ) Examiner: Unassigned  
Filed: June 28, 2004 )  
For: NON-INVASIVE DEVICE FOR ) Confirmation No.: \_\_\_\_\_  
MEASURING BLOOD )  
TEMPERATURE IN A CIRCUIT )  
FOR THE EXTRACORPOREAL )  
CIRCULATION OF BLOOD, AND )  
EQUIPMENT PROVIDED WITH )  
THIS DEVICE )

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**PRELIMINARY AMENDMENT**

Prior to the examination of the above application, please amend this application  
as follows:

**Amendments to the Abstract** begin on page 2 of this Amendment.

**Amendments to the Claims** are reflected in the listing of claims beginning on  
page 3 of this Amendment.

**Remarks** begin on page 9 of this Amendment.

**AMENDMENTS TO THE ABSTRACT:**

Please substitute the Abstract with the following:

A non-invasive device for measuring blood temperature in a circuit for the extracorporeal circulation of blood includes a line in which blood taken from a patient flows. The device also includes a temperature sensor connected to the line and provided with a device for measuring the intensity of an electromagnetic radiation. The measuring device faces a connecting portion or window of the line that is permeable by electromagnetic radiation in a first wave band, and generates a first signal, correlated with the electromagnetic radiation in the first band and therefore with the temperature of the blood flowing in the line.

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

Cancel claims 1-32.

33. (New) A non-invasive device for measuring blood temperature in a circuit for the extracorporeal circulation of blood, said device comprising a line for receiving blood from a patient, and a temperature sensor connected to said line and generating a first signal indicative of a blood temperature of the blood flowing in said line, said temperature sensor comprising a device for measuring an intensity of an electromagnetic radiation, and said line comprising a connecting portion facing said measuring device and permeable to electromagnetic radiation in a first wave band; said first signal corresponding to an intensity of said electromagnetic radiation in said first wave band.

34. (New) A device according to claim 33, wherein said measuring device is housed within a casing, behind a window formed in said casing; said connecting portion of said line being completely superimposed on said window, to cover a solid angle of view of said measuring device.

35. (New) A device according to claim 33, wherein said measuring device comprises a thermopile, having at least one hot junction and at least one cold junction.

36. (New) A device according to claim 35, wherein said temperature sensor comprises a temperature controller, said temperature controller maintains the at least one cold junction at a controlled temperature.

37. (New) A device according to claim 36, wherein said temperature controller comprises:

a thermistor, connected thermally to the cold junction of said measuring device, said thermistor supplying a second signal, said signal corresponding to said controlled temperature;

a solid state heat pump, having a low temperature surface thermally connected to said measuring device and a high temperature surface; and

a control circuit, connected to said thermistor, to receive said second signal, said control circuit also being connected to said heat pump to supply a control signal correlated with said second signal.

38. (New) A device according to claim 37, wherein said heat pump comprises a Peltier cell.

39. (New) A device according to claim 37, comprising a heat sink element placed in contact with said high temperature surface of said heat pump.

40. (New) A device according to claim 37, wherein said controlled temperature is a constant temperature in the range from 5°C to 15°C.

41. (New) A device according to claim 33, wherein said connecting portion is made from a material having a substantially constant transmittance in said first wave band, and said material having an absorbance substantially equal to zero in said first wave band.

42. (New) A device according to claim 33, wherein said connecting portion is made from a material having an essentially constant transmittance in a temperature range from 30°C to 40°C.

43. (New) A device according to claim 33, wherein said connecting portion is made from a material chosen from a group including high-density polyethylene, low-density polyethylene, and poly(4-methyl-1-pentene).

44. (New) A device according to claim 33, further comprising a filter interposed between said measuring device and said connecting portion of said line.

45. (New) A device according to claim 44, wherein said filter comprises a sheet of material being substantially opaque to electromagnetic radiation outside a second wave band and lying within said first wave band.

46. (New) A device according to claim 45, wherein said second wave band is in a range from 8  $\mu\text{m}$  to 14  $\mu\text{m}$ .

47. (New) A device according to claim 45, wherein said filter includes germanium.

48. (New) A device according to claim 45, wherein said filter has one face facing said connecting portion of said line.

49. (New) A device according to claim 33, wherein an infrared radiation band includes at least a portion of said first wave band.

50. (New) A device according to claim 36, comprising a control unit associated with said temperature sensor, for receiving said first signal and for determining said blood temperature according to:

$$T_P = F(V_B) + T_0$$

where  $T_P$  is the blood temperature,  $V_B$  is the first signal, and  $T_0$  is the controlled temperature.

51. (New) A device according to claim 50, wherein:

$$F(V_B) = K * V_B$$

where  $K$  is an experimentally determined constant.

52. (New) A control apparatus for an extracorporeal blood circuit, said extracorporeal blood circuit being connected to a blood purification machine, said extracorporeal blood circuit further comprising an arterial branch connected to at least one blood treatment element and a venous branch connected to at least one blood treatment element, the control apparatus comprising a non-invasive device for measuring a blood temperature according to claim 33.

53. (New) An apparatus according to claim 52, wherein the non-invasive device has a sensor for measuring a first blood temperature of blood leaving a patient along the arterial branch upstream of said blood treatment element, a control unit configured to regulate a blood temperature in the extracorporeal blood circuit as a function of the first blood temperature and a reference temperature, and a device for regulating the blood temperature in the extracorporeal blood circuit, said device being connected to a portion of the venous branch downstream from said blood treatment element.

54. (New) An apparatus according to claim 53, wherein said regulating device, is combined with said portion of the venous branch to form a heat exchanger; said control unit being connected to said temperature regulating device.

55. (New) An apparatus according to claim 53, wherein said regulating device comprises a line for conveying a fluid which can be heated to a fluid temperature lying within a specified range, about 37° C.

56. (New) An apparatus according to claim 53, wherein said regulating device has a seat configured to house said portion of the venous branch.

57. (New) An apparatus according to claim 53, wherein said extracorporeal blood circuit is connected to a pump to convey the blood along the extracorporeal blood circuit, the apparatus comprising a sensor for detecting an operating state of the pump; the control unit keeping the fluid temperature substantially equal to said predetermined temperature when the pump is not in operation.

58. (New) An apparatus according to claim 53, wherein said venous branch has a post-dilution node; said portion of the venous branch being located downstream of said post-dilution node.

59. (New) An apparatus according to claim 53, wherein said blood treatment element comprises a hemodialysis filter, said hemodialysis filter comprising a blood compartment and a dialysate compartment within which a dialysate flows.

60. (New) An apparatus according to claim 53, wherein said blood treatment element comprises a hemodialysis filter comprising a blood compartment and a dialysate compartment within which a dialysate flows, and a pre- or post-dilution node for the introduction of a replacement fluid.

61. (New) An apparatus according to claim 53, wherein said blood treatment element comprises a hemofiltration filter.

62. (New) An apparatus according to claim 53, wherein said blood treatment element comprises a hemofiltration filter and a pre- or post-dilution node for the introduction of a replacement fluid.

63. (New) An apparatus according to claim 53, wherein said control unit regulates the blood temperature in the extracorporeal blood circuit as a function of the first blood temperature and the reference temperature at predetermined time intervals.

64. (New) An apparatus according to Claim 53 or 63, wherein said control unit regulates the overall temperature as a function of the difference between the first blood temperature and the reference temperature.

REMARKS

Claims 1-32 are pending in this application. In this Preliminary Amendment, claims 1-32 are cancelled and 33-64 are added. No new matter has been added by this Amendment.

Applicant respectfully requests entry of this Preliminary Amendment, examination of this application, and timely allowance of the pending claims.

If there is any fee due in connection with the filing of this Preliminary Amendment, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

Dated: June 28, 2004

By:   
Aaron Parker  
Reg. No. 50,785

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